

REMARKS

Claims 8-11, 18, and 19 are pending in the present application.

The rejection of Claims 8-11, 18, and 19 under 35 U.S.C. §103(a) over JP 10-251179 optionally in view of US 5,780,690 (Berg et al), US 4,391,997 (Mendiratta '997), and US 4,400,555 (Mendiratta '555), is traversed in part and obviated in part by amendment.

The present invention provides a process for producing bisphenol A comprising condensing phenol and acetone in the presence of, as a catalyst, an acid type of ion exchange resin which is modified in part with a sulfur-containing amine compound, wherein the ion exchange resin which has different modification rate is used in accordance with the concentration of methanol in acetone as a starting raw material and:

(i) said condensing is performed in reaction equipment which comprises at least two reactors in series,

(ii) said ion exchange resin has a modification rate in the range of 26 to 65 mol%,

(iii) the methanol concentration in acetone is in the range of 700 to 8000 ppm by weight, and

(iv) the water content of the starting raw material for condensing is maintained to be less than 0.4% by weight (see Claim 8).

As was previously noted, an important feature of the present invention is that the methanol concentration in acetone ranges from 700 to 8000 ppm . The only amount of methanol in acetone disclosed by JP 10-251179 is that provided by the Example, which is limited to 1% by weight (10000 ppm). This disclosure by JP 10-251179 is outside the range of that presently claimed. The Examiner points to the disclosure of Berg et al and alleges that this disclosure shows that it is "known that the presence of methanol deactivates the

catalysts.” However, Applicants note that the disclosure of Berg et al specifically indicates that that amount of alkylating substances should be reduced to as low an amount as possible and is preferably are removed (see Abstract and column 1).

Specifically, Berg et al disclose the reduction of alkylating substances to 0.1% (1000 ppm), preferably 0.05% (500 ppm), particularly preferably 0.01% (100 ppm) (see column 2, lines 16-17). Therefore, at best, Berg et al would disclose a range that overlaps with the presently claimed range. However, when used for the purpose disclosed by the Examiner, this reference clearly would lead the artisan to reduce the methanol content to a value below the range presently claimed (i.e., less than 500 ppm, particularly less than 100 ppm). In fact, the Examples of Berg et al clearly show that it is *undesireable* to have a content of methanol in acetone as presently claimed. Specifically, in the table at the top of column 3, Berg et al show that when the content of methanol is within the range of the present invention (e.g., 5000 ppm; see Example 2) the catalyst converts 50% less after 20 batches as compared to the preferred methanol content that is less than that presently claimed (e.g., 100 ppm; see Example 1).

Applicants remind the Examiner that MPEP §2141.02 states: “A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). In view of the foregoing, Applicants submit that Berg et al would actually lead the artisan away from the methanol content in acetone as presently claimed rather than to it as alleged by the Examiner.

Furthermore, in Comparative Example 2 to 4 of the present invention, Applicants have shown that when acetones containing 10000 ppm or more of methanol are used the conversions of phenol are clearly decreased after 300 hrs and 600 hrs in first stage reaction

and second stage reaction. Contrary to the Examiner's allegations, these data are relevant as the modification rate of Example of JP 10-251179 is 30% which is near to 25% of Comparative Example 2 of the present invention containing 10000 ppm of methanol in acetone and the modification rate of Comparative Example 3 of the present invention is 30% containing 15000 ppm of methanol in acetone. As stated above, it is only the Examples of JP 10-251179 that discloses the use of acetone containing 10000 ppm of methanol. Therefore, the data presented in the present application are relevant.

Moreover, in the presently claimed invention an ion exchange resin which has different modification rate is used in accordance with the concentration of methanol in acetone as a starting raw material. This is neither disclosed nor suggested by any of JP-10-251179, Berg et al, Mendiratta '997, and Mendiratta '555.

In Example 1 of JP-10-251179, bisphenol A is produced using an ion exchange resin having a modification rate of 30 mol% and acetone containing 10000 ppm (1wt%) of methanol. In this example, water is added to resulting water content of the reactant of 0.5% by weight. Then the present invention is distinguished from this example. By maintaining the water content in less than 0.4% by weight, the deterioration of catalytic activity is avoided as described in page 9, line 21 to 23 of the specification.

Berg et al exemplifies ion exchange resins of the modification rate up to 11.5 mol% are used in the content of alkylating substances (methanol) in phenol and acetone less than 100 ppm. In Example 2 of Berg et al, phenol containing 5000 ppm of methanol is used then acetone conversion is decreased to 43.5% after 20 batches. The countermeasure for phenol or acetone containing such amount of methanol is not disclosed.

Moreover, the reaction of Examples of JP-10-251179 and Berg et al are only one-stage reaction. Multistage reaction systems are not disclosed or exemplified in these

references. Claim 8 of the present invention is derived from the discovery that multistage reaction system is profitable for the use of acetone containing high amounts of methanol because methanol, which is poison for the catalyst of ion exchange resins, is provided separately each catalyst bed with acetone in the multistage reaction system. As such, the life of the catalyst of ion exchange resins is prolonged by using the multistage reaction system, even if acetone containing high amount of methanol was used.

A bisphenol synthesis reactor system employing multiple acetone injection in an ion exchange catalyzed bisphenol A synthesis process is disclosed in Mendiratta '997 and Mendiratta '555. An improved reaction effluent product distribution and color is obtained from these processes. However, the effect of the multistage reaction of the presently claimed invention above is quite distinct from that of Mendiratta '997 and Mendiratta '555. Further, Mendiratta '997 and Mendiratta '555 fail to disclose the recited methanol content, which is also not apparent from the disclosures of JP 10-251179 or Berg et al.

In the present invention, the deterioration of catalytic activity by containing the recited quantity of methanol in acetone of raw material is greatly suppressed by the method of the present invention. The present invention is obtained by combination of the multistage reaction system, modification rate of the ion exchange resin and water content of the starting raw material. JP 10-251179 even when viewed together with, Berg et al., Mendiratta '997, and Mendiratta '555, simply provides no disclosure or suggestion of using the multistage reaction system for acetone containing 700 ppm to 8000ppm by weight of methanol in the bisphenol A synthesis process, much less the advantages flowing therefrom.

In view of the foregoing, Applicants request withdrawal of this ground of rejection.

Finally, Applicants respectfully request that the obviousness-type double patenting rejection of Claims 8-17 over Claims 1-13 of US 6,740,784 and the provisional obviousness-type double patenting rejection of Claims 8-17 over co-pending U.S. Application No. 10/433,155 in view of US 4,400,555 be held in abeyance until an indication of allowable subject matter in the present application. If necessary, a terminal disclaimer will be filed at that time. Until such a time, Applicants make no statement with respect to the propriety of this ground of rejection. However, Applicants remind the Examiner that MPEP §804 states:

If the "provisional" double patenting rejections in both applications are the only rejections remaining in those applications, the examiner should then withdraw that rejection in one of the applications (e.g., the application with the earlier filing date) and permit the application to issue as a patent. The examiner should maintain the double patenting rejection in the other application as a "provisional" double patenting rejection which will be converted into a double patenting rejection when the one application issues as a patent.

Accordingly, if the present amendment places the elected claims in condition for allowance, Applicants note that the provisional obviousness-type double patenting rejection over US 10/433,155 in view of US 4,400,555 should be withdrawn if US 10/433,155 is not in condition for allowance.

Applicants submit that the present application is now in condition for allowance. Early notification of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Vincent K. Shier, Ph.D.
Registration No. 50,552

Customer Number

22850

Telephone #: (703) 413-3000
Fax #: (703) 413-2220